AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An optical module ~~containing~~ comprising:
an optical multiplexer with at least one optical data access, an optical probe access and an optical data output, wherein an optical data signal carried by n different interleaved wavelength channels, each at a bit-rate F/n, as well as an optical clock signal at frequency F and at a wavelength λ_c are launched respectively on said at least one optical data access and said optical probe access such that in said optical multiplexer said optical data signal is synchronized with said optical clock signal to give a converted optical time domain multiplexed signal on said optical data output at a bit-rate of F and at a wavelength of λ_c; and
an optical clock that includes a multiplier and a laser and configured to receive a clock signal at a frequency F/n and generate said optical clock signal at frequency F.

2. (Currently Amended) Optical module according to claim 1, ~~whereby said optical module contains~~ further comprising an optical filter on said optical data output and configured to pass ~~let passing~~ only an optical signal at wavelength λ_c.

3. (Original) Optical module according to claim 1, whereby said optical multiplexer comprises a semiconductor optical amplifier Mach-Zehnder interferometer.

4. (Original) Optical module according to claim 1, whereby said optical multiplexer comprises a non-linear optical loop mirror.

5. (Original) Optical module according to claim 1, whereby said optical multiplexer comprises an interleaver for interleaving the n different wavelength channels.

6. (Canceled).

7. (Canceled).

8. (New) Optical module according to claim 1, wherein the multiplier is configured to run an integrated electro-absorption modulator in combination with the laser.

9. (New) Optical module according to claim 8, wherein the integrated electro-absorption

modulator is a $LiNbO_3$ Mach-Zehnder intensity modulator.

10. (New) Optical module according to claim 8, wherein the laser is a distributed feedback laser.

11. (New) Optical module according to claim 1, wherein the optical multiplexer includes a first optical data access and a second optical data access, and the n different interleaved wavelength channels are launched in parallel on both the first and the second optical data access.

12. (New) Optical module according to claim 3, wherein the semiconductor optical amplifier Mach-Zehnder interferometer includes:

a first set of at least three semiconductor optical amplifiers configured to receive the n different interleaved wavelength channels and said optical clock signal;

a second set of at least two semiconductor optical amplifiers, wherein the first set and the second set are in series with one another; and

a third set of at least one semiconductor optical amplifier configured to output the converted optical time domain multiplexed signal at a bit-rate of F and at a wavelength of λ_c, wherein the second set and the third set are in series with one another.

13. (New) An optical time domain multiplexer system, comprising:

an optical multiplexer with at least one optical data access, an optical probe access and an optical data output and including a semiconductor optical amplifier Mach-Zehnder interferometer having:

a first set of at least three semiconductor optical amplifiers configured to receive n different interleaved wavelength channels, each at a bit-rate F/n, and an optical clock signal, having a frequency F and a wavelength λ_c,

a second set of at least two semiconductor optical amplifiers, wherein the first set and the second set are in series with one another, and

a third set of at least one semiconductor optical amplifier configured to output a converted optical time domain multiplexed signal at a bit-rate of F and at a wavelength of λ_c, wherein the second set and the third set are in series with one another,

wherein an optical data signal carried by the n different interleaved wavelength channels and the optical clock signal are launched respectively on said at least one optical data access and said optical probe access such that in said optical multiplexer said optical

data signal is synchronized with said optical clock signal to produce the converted optical time domain multiplexed signal on said optical data output.

14. (New) The optical time domain multiplexer system of claim 13, further comprising an optical filter on said optical data output and configured to pass only the converted optical time domain multiplexed signal at a wavelength of λ_c.

15. (New) The optical time domain multiplexer system of claim 13, further comprising an optical clock that includes a multiplier and a laser and configured to receive a clock signal at a frequency F/n and generate said optical clock signal at frequency F.

16. (New) The optical time domain multiplexer system of claim 15, wherein the multiplier is configured to run an integrated electro-absorption modulator in combination with the laser.

17. (New) The optical time domain multiplexer system of claim 16, wherein the integrated electro-absorption modulator is a $LiNbO_3$ Mach-Zehnder intensity modulator.

18. (New) The optical time domain multiplexer system of 16, wherein the laser is a distributed feedback laser.

19. (New) The optical time domain multiplexer system of claim 15, further comprising an emitter configured to generate the clock signal at a frequency F/n received by the optical clock.

20. (New) The optical time domain multiplexer system of claim 13, wherein the optical multiplexer includes a first optical data access and a second optical data access, and the n different interleaved wavelength channels are launched in parallel on both the first and the second optical data access.